

U.S.S.N. 10/082,009

Listing of the Claims

Please amend claims 1, 5, 8, and 10 as follows.

Please cancel claims 2, 4, 11, 12, 14, and 21.

1. (currently amended) A method for preventing photo-induced chemical attack on a copper interconnect during removal of an overlying copper oxide containing surface comprising the steps of:

providing a substrate comprising a dielectric material and an exposed copper oxide containing surface comprising overlying a copper oxide interconnect;

providing an acidic cleaning solution having a pH of between about 3.0 to about 4.5 for contacting the exposed copper oxide containing surface; and,

shielding the exposed copper oxide containing surface to substantially block incident light from impacting the exposed copper oxide containing surface while contacting the exposed copper oxide containing surface with the acidic cleaning solution to remove the copper oxide.

2. (cancelled)

U.S.S.N. 10/082,009

3. (previously presented) The method of claim 1, wherein the incident light has a wavelength of between about 300 nanometers and about 800 nanometers.

4. (cancelled)

5. (currently amended) The method of claim 1 [[2]], wherein the step of shielding is performed during a post-CMP cleaning process.

6. (previously presented) The method of claim 5, wherein the post-CMP cleaning process comprises contacting the substrate with the cleaning solution according to at least one of a dipping process, a brushing process, and megasonic cleaning process.

7. (original) The method of claim 6, wherein the post CMP cleaning process is automated for processing a substrate through a plurality of cleaning stations.

8. (currently amended) The method of claim 1, wherein the step of shielding comprises placing a light blocking means between the incident light and the copper oxide containing surface.

U.S.S.N. 10/082,009

9. (previously presented) The method of claim 7 wherein the step of shielding comprises placing a light blocking means to at least partially surround each of the plurality of cleaning stations.

10. (currently amended) A method for preventing photo-induced chemical attack of a ~~cleaning~~ copper oxide removal solution on a copper containing surface interconnect comprising overlying copper oxide comprising the steps of:

providing a copper containing surface interconnect comprising formed in a dielectric layer formed on comprising a semiconductor process wafer;

performing a copper CMP process to form copper oxide on the surface of the copper interconnect;

providing an acidic cleaning solution having a pH of between about 3.0 to about 4.5 for cleaning the copper containing surface removing the copper oxide; and,

shielding the cleaning solution and the copper containing surface oxide to substantially block incident light having a wavelength of from about 300 nanometers to about 800 nanometers while cleaning removing the copper oxide containing surface with the acidic cleaning solution in a cleaning process.

11. - 15. (cancelled)

U.S.S.N. 10/082,009

16. (previously presented) The method of claim 10, wherein the cleaning process comprises contacting the copper containing surface with the acidic cleaning solution according to at least one of a dipping process, a brushing process, and a megasonic cleaning process.

17. (previously presented) The method of claim 16, wherein the cleaning process comprises an automated process for processing the substrate at a plurality of cleaning stations.

18. (previously presented) The method of claim 16, wherein the step of shielding comprises placing a light blocking means between the incident light and the cleaning process.

19. (previously presented) The method of claim 18, wherein placing a light blocking means comprises placing a light blocking means to at least partially surround the cleaning process.

20. (previously presented) The method of claim 17 wherein the step of shielding comprises placing a light blocking means to at least partially surround each of the plurality of cleaning stations.

21. (cancelled)